BOTANY.[1]

BRANCHING OF OSMUNDA CLAYTONIANA.—In those ferns in which the vascular system of the stem consists of a ring of separate bundles, branches and leaves usually arise by an increase by division of the bundles, until a portion is deflected with surrounding tissue to the lateral member. The method in the Osmundas is not so simple. In Fig. 1, *A* shows a cauline bundle, *b b'*, in which an outer portion is being separated to form the bundle of a stipe, as at *C*. Two lateral portions, between this and what remains, are deflected to roots at each side of the base of the stipe which originate at the same time, as at *r r'*. The divisions which remain in the stem unite with similarly divided parts of adjoining

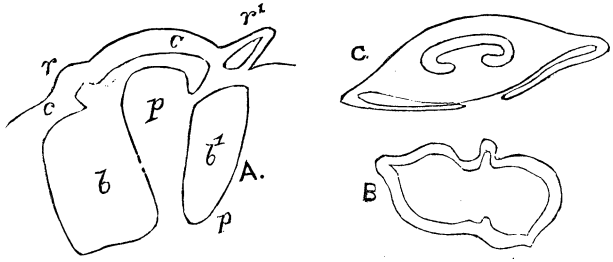

FIG. 1.—*A*, segment of cross-section of stem; *b b'*, a bundle dividing into a central outer portion, which enters a stipe, two lateral portions which enter the beginnings of roots *r r*, and two larger portions which remain in the stem; *p*, pit; *c*, cortex; *B*, section of stem below a fork, showing preparatory constriction; *C*, section of stipe, about an inch from the base, showing single large bundle. *A*, reduced from camera sketch, magnified ten, *B* and *C* about two diameters.

bundles, so that the number in the stem remains the same. From the condensed character of the stem, the vascular system at any section appears as a series of incomplete and variously united bundles.—*A. A. Crozier, Grand Rapids, Mich., Jan. 27, 1886.*

MOVEMENTS OF DESMIDS.—Herr G. Klebs describes (*Biologisches Centralblatt*) four different kinds of movements in the Desmidieæ, viz: 1. A forward motion on the surface, one end of the cell touching the bottom, while the other end is more or less elevated, and oscillates backwards and forwards during the movement. This is especially well seen in *Closterium acerosum*. 2. An elevation in a vertical direction from the substratum; the free end making wide circular movements (*C. didymotocum*). 3. A similar motion, followed by a sinking of the free end and an elevation of the end previously depressed, and so on alternately (*C. moniliforme*). 4. An oblique elevation, so that both ends touch the bottom; lateral movements in this position; then an elevation and circular motion of one end and a sinking again to an oblique or horizontal position (*C. dianæ* and *archerianum*). These move-

[1]Edited by Professor CHARLES E. BESSEY, Lincoln, Nebraska.

ments are none of them peculiar to particular species; several of them are often combined in one. A free swimming on the surface, like that of diatoms, was never observed.

The first two of these movements depend on the formation, during the motion, of a filament of mucilage, by which the desmid is attached to the bottom; the gradual lengthening of this filament, by the formation of fresh mucilage, causes the desmid to rise. The filament is best detected by a weak solution of methyl-violet or fuchsin, which does not kill the desmid. Cyanin also answers, but not so well. Other pigments do not stain it. Many species of Euastrum, Cosmarium, Staurastrum and Pleurotænium exhibit the same phenomenon. The greatest length of filament observed was $3^{mm.}$; the most rapid motion, in *Closterium acerosum*, 112μ in 30 sec.; many species are quite motionless. Light exercises an influence on the direction of the movement similar to that of zoöspores, but not on its rapidity. The elevation and depression appear to be independent of the direction of gravitation.

The author considers the cause of the motion to be the exudation of mucilage, which does not take place simultaneously and uniformly over the whole surface of the desmid. This formation of mucilage is not the result of disintegration of the cell-wall itself; it proceeds directly from the cytoplasm and passes through the cell-wall without the latter undergoing any change. Many species are completely surrounded by a gelatinous envelope, while others are comparatively free.—*A. W. Bennett, London.*

Pleomorphism of Algæ.—Dr. A. Hanszig publishes in the *Botanisches Centralblatt* an elaborate paper which has for its object to prove that a large number of algæ hitherto referred to the families Schizophyceæ or Cyanophyceæ, Chroococcaceæ, Oscillariaceæ, Nostocaceæ, Scytonemaceæ, Confervaceæ, Chætophoraceæ, Siphonocladaceæ and Ulvaceæ are but stages in the evolution of single forms. He describes the mode in which these various forms of algæ may develop one out of another, and he regards also the Schizophyceæ and Schizomycetes as connected together by insensible gradations. Thus we may have one and the same alga occurring in its mature form, and in its Stigonema, Leptothrix, unicellular, Nostoc, Ulothrix, and a variety of other forms. Euglena he regards also as genetically connected with the Phycochromaceæ and Oscillariaceæ. Dr. Hanszig refers to a new analogy between the Schizomycetes and Schizophyceæ by the discovery of a motile organism which he names *Chroomonas nordstedtii*, and which he regards as the swarm-cell condition of a phycochromaceous alga, probably an Oscillaria.—*A. W. Bennett.*

Tree Growth on the Plains.—From a recent paper on "Tree Planting on the Plains," by Robert W. Furnas, we extract the following statistics of the growth of trees, as shown by actual

measurement of trees of known ages. The measurements were made at the uniform height of two feet above the ground.

Common Name.	*Scientific Name.*	*Years Old.*	*Circumference. (Inches.)*
White Elm	Ulmus americana	15	24¾
Red Elm	Ulmus fulva	24	36
Osage Orange	Maclura aurantiaca	25	26¼
Soft Maple	Acer dasycarpum	18	54¾
" "	" "	18	69¼
Box Elder	Negundo aceroides	14	25¼
" "	" "	14	31⅛
Honey Locust	Gleditschia triacanthos	22	40¼
" "	" "	22	41½
Black Locust	Robinia pseud-acacia	24	60½
Kentucky Coffee tree	Gymnocladus canadensis	14	25½
Sycamore	Platanus occidentalis	16	43½
Black Walnut	Juglans nigra	22	48
" "	" "	22	50¼
White Walnut	Juglans cinerea	22	49¼
Shagbark Hickory	Carya alba	24	30
Chestnut	Castanea vesca, *var.* americana	14	24½
Burr Oak	Quercus macrocarpa	22	36⅛
White Oak	Quercus alba	22	29
White Ash	Fraxinus americana	22	32¼
Green Ash	Fraxinus viridis	22	30
Cottonwood	Populus monilifera	23	78¼
"	" "	23	93
White Pine	Pinus strobus	20	36¼
Scotch Pine	Pinus sylvestris	15	23
Austrian Pine	Pinus laricis, *var.*	15	22½

BOTANICAL NEWS.—Late numbers of *Annales des Sciences Naturelles* contain papers on the following subjects, viz: The actual state of our knowledge of the function of chlorophyll-line, Researches upon the development of the sporogone of the Hepaticæ, Observations upon the Santalaceæ, Researches upon the comparative anatomy of the stem of the Dicotyledons, Researches upon the variation of the respiration with the development of plants, The respiratory function of vegetation.——The more important papers in the sixteenth volume, just closed, of Pringsheim's Jahrbücher für Wissenschaftliche Botanik are Schimper's Investigations upon chlorophyll bodies, Tschirch's Contributions to a knowledge of the mechanical tissue systems of plants, De Vries' Plasmolytic studies on the vacuole wall, Reiche's Upon the anatomical changes in the perianth-whorl which precede the development of the fruit. This volume contains twenty-eight plates.——An interesting paper on intramolecular respiration, by W. Pfeffer, is just received. It is in continuation of work done by Dr. W. P. Wilson, of Cambridge, Mass.——A white-seeded variety of the honey locust is described

by Thomas Meehan in Proceedings of the Academy of Natural Sciences, Philadelphia, December 1. The tree bearing these anomalous seeds is of considerable age, and stands near Germantown, Pa.——A neatly printed Catalogue of the Phænogamous and vascular cryptogamous plants of Fitchburg [Mass.] and vicinity is worthy of note as being "the work of students of the Fitchburg high school." It is said to represent "about seven years of diligent research." It is a very creditable production, and indicates good work in the school.——The Fourth Annual Report of the Board of Control of the New York Agricultural Experiment Station, for the year 1885, appears with a most satisfactory promptness. Its contents show the continuation of the high class of work for which this station has been distinguished.——E. W. D. Holway, of Decorah, Iowa, has made out a set of genus labels of the fungi for use in herbaria. There are about 720 names, which represent, after deducting duplicates, from 500 to 600 different genera. The printing is done by H. N. Patterson, of Oquawka, Ills., which is a sufficient guarantee of the neatness of the typography.

ENTOMOLOGY.

ON THE CINUROUS THYSANURA AND SYMPHYLA OF MEXICO.—It was my good fortune during a short visit to Mexico in the spring of 1885, to discover the one insect which I scarcely hoped to find, so rare are the species and individuals in other parts of the world. This was *Japyx saussurii*, described and figured by Humbert in *Revue et Mag. de Zoölogie*, xx, 345, 1868. His descriptions and excellent figures were made from three specimens collected by M. Sumichrast at Santa Cruz, Moyoapam, near Orizaba. It was evidently hopeless to look for Japyx on the Mexican plateau in the dry season, if it lives there at all; though near Vienna *Japyx solifugus* occurs in dry, sandy places, where, in 1872, I had the rare pleasure of observing it under the kind guidance of Dr. Brauer. The Cinuran characteristic of the *tierra templada* is a species of Machilis, which was common under stones at Saltillo.

At Cordova, however, owing to the kindness of a Spanish gentleman, the owner of a coffee plantation, who allowed me the use of one of his laborers, an intelligent Indian, I found about a dozen specimens of *Japyx saussurii*, in the shaded damp coffee growth, which my Indian turned up with his hoe from the rich, black soil under fallen banana trunks and loose stones. They seemed to be comparatively common, and very active in their movements.

On comparing with it our northern *J. subterraneus* Pack., from Kentucky, our species is seen to differ decidedly from the Mexican in the much squarer head, which is broader in front; in the broader prothorax, and especially in the longer and narrower tenth abdominal segment. It also differs in the denticulations of